

- 22 -

WE CLAIM:

1. A process for the preparation of an organosilicon condensate which comprises reacting together:
 - 5 (A) at least one silicon containing compound having at least one silanol group; and
 - (B) at least one silicon containing compound having at least one -OR group wherein R represents an alkyl group having from 1 to 8 carbon atoms, or an alkoxyalkyl group having from 2 to 8 carbon atoms in the presence of
 - 10 (C) a calcium or magnesium catalyst selected to allow the reaction to proceed and
 - (D) at least one protic solvent.
2. A process according to claim 1 wherein the at least one silicon compound having at least one silanol group and the at least one silicon containing compound having at least one -OR group are in a molar ratio ranging from 1:2 to 2:1.
- 15 3. A process according to claim 1 or claim 2 wherein the at least one silicon containing compound having at least one silanol group and the at least one silicon containing compound having at least one -OR group are in a 1:1 molar ratio.
- 20 4. A process according to any one of the preceding claims wherein the organosilicon condensate is a siloxane.
5. A process according to claim 4 wherein the siloxane is a polysiloxane.
- 25 6. A process according to claim any one of the preceding claims wherein the at least one silicon containing compound having at least one silanol group is a silanol.
7. A process according to claim 6 wherein the silanol has between one and three 30 unsubstituted or substituted hydrocarbon groups having from 1 to 18 carbon atoms.
8. A process according to claim 6 wherein the silanol has one OH group.

- 23 -

9. A process according to claim 6 wherein the silanol has two OH groups.
10. A process according to claim 6 wherein the silanol has three OH groups.
- 5 11. A process according to claim 6 wherein the silanol has four OH groups.
12. A process according to claim 6 wherein the silanol is diphenyl silanediol.
13. A process according to claim 6 wherein the silanol bears a crosslinkable group.
- 10 14. A process according to claim 13 wherein the crosslinkable group is a double bond.
15. A process according to claim 14 wherein the double bond is a carbon-carbon double bond.
- 15 16. A process according to claim 14 wherein the double bond is selected from an acrylate double bond, a methacrylate double bond and a styrene double bond.
17. A process according to claim 13 wherein the crosslinkable group is an epoxide.
- 20 18. A process according to claim 1 wherein the at least one silicon containing compound having at least one -OR group is a compound with the general formula $G_ySi(OR)_{4-y}$ wherein y has a value of 0, 1, 2 or 3,
25 G represents a unsubstituted or substituted hydrocarbon group having from 1 to 18 carbon atoms; and
R represents an alkyl group having from 1 to 8 carbon atoms or an alkoxyalkyl group having from 2 to 8 carbon atoms.
- 30 19. A process according to claim 18 wherein the at least one silicon containing compound having at least one -OR group is an alkoxy silane.
20. A process according to claim 19 wherein the alkoxy silane has one alkoxy group.

21. A process according to claim 19 wherein the alkoxy silane has two alkoxy groups.
22. A process according to claim 19 wherein the alkoxy silane has three alkoxy groups.

5
23. A process according to claim 19 wherein the alkoxy silane has four alkoxy groups.
24. A process according to claim 18 wherein (OR) is selected from the group consisting of methoxy, ethoxy, n-propoxy, i-propoxy, n-butoxy, i-butoxy, t-butoxy.

10
25. A process according to claim 19 wherein the alkoxy silane bears a crosslinkable group.
26. A process according to claim 25 wherein the alkoxy silane bears a crosslinkable group on G.

15
27. A process according to claim 25 or 26 wherein the crosslinkable group is a double bond.
- 20 28. A process according to claim 27 wherein the double bond is a carbon-carbon double bond.
29. A process according to claim 27 wherein the crosslinkable group is a double bond selected from an acrylate double bond, a methacrylate double bond and a styrene double bond.

25
30. A process according to claim 25 or 26 wherein the crosslinkable group is an epoxide.
- 30 31. A process according to claim 19 wherein the alkoxy silane is a compound selected from the group consisting of 3-methacryloxypropyltrimethoxysilane, 3,3,3-trifluoropropyltrimethoxysilane, 1H, 1H, 2H, 2H-perfluoroctyltrimethoxysilane,

- 25 -

octyltrimethoxysilane, 3-styrylpropyltrimethoxysilane, and 3-glycidoxypolypropyltrimethoxysilane, or a mixture thereof.

32. A process according to any one of the preceding claims wherein the calcium or 5 magnesium catalyst is not calcium carbonate, calcium phosphate, or magnesium carbonate.

33. A process according to claim 32 wherein the calcium or magnesium catalyst is calcium hydroxide, calcium oxide, magnesium hydroxide or magnesium oxide.

10 34. A process according to claim 33 wherein the calcium or magnesium catalyst is calcium hydroxide.

35. A process according to claim 33 wherein the calcium or magnesium catalyst is calcium oxide.

15 36. A process according to claim 33 wherein the calcium or magnesium catalyst is magnesium hydroxide.

37. A process according to claim 33 wherein the calcium or magnesium catalyst is 20 magnesium oxide.

38. A process according to any one of the preceding claims wherein the protic solvent is an alcohol.

25 39. A process according to claim 38 wherein the protic solvent is selected from the group consisting of methanol, ethanol, 1-propanol, 2-propanol, 1-butanol and 2-butanol.

40. A process according to any one of claims 1 to 37 wherein the protic solvent is water.

30 41. A process for the preparation of an organosilicon condensation product which comprises condensing at least one silicon containing compound having

(a) at least one silanol group;

and

- 26 -

(b) at least one -OR group

wherein R represents an alkyl group having from 1 to 8 carbon atoms, or an alkoxyalkyl group having from 2 to 8 carbon atoms in the presence of

(c) a calcium or magnesium catalyst selected to allow the reaction to proceed; and

5 (d) at least one protic solvent.

42. A process according to claim 41 wherein the at least one silicon containing compound comprises both (i) a silanol-terminated polydiorganosiloxane and (ii) a polydiorganosiloxane terminated with a silanol group at one end and a triorganosiloxy group at the other.

10 43. A process according to any one of the preceding claims wherein the calcium or magnesium catalyst is separated from the organosilicon condensate.

15 44. A process according to any one of the preceding claims wherein the catalyst is employed in an amount of from 0.0005 to 5% by mole based on the total silicon containing compounds.

20 45. A process as claimed in claim 44 wherein the catalyst is employed in an amount of from 0.01 to 0.5% by mole based on the total silicon containing compounds.

25 46. A process according to any one of the preceding claims wherein the solvent is employed in an amount of from 0.02% to 200% by mole based on the total silicon containing compounds.

47. A process according to claim 46 wherein the solvent is employed in an amount of from 0.2% to 100% by mole based on the total silicon containing compounds.

30 48. A process according to claim 47 wherein the solvent is employed in an amount of 0.4 to 50% by mole based on the total silicon containing compounds.

49. A process according to claim 48 wherein the solvent is water employed in an amount of less than 8% by mole based on the total silicon containing compounds.

- 27 -

50. A process according to claim 49 wherein the solvent is water employed in an amount of less than 4% by mole based on the total silicon containing compounds.

5 51. A process according to any one of the preceding claims carried out at a temperature in the range from 40°C to 150°C.

52. A process according to claim 51 carried out at a temperature in the range from 50°C to 100°C.

10

53. A process according to claim 52 carried out at about 80°C.

54. A polysiloxane prepared by the method of any one of the preceding claims having an absorption of less than 15cm⁻¹ at about 2820nm.

15

55. A polysiloxane according to claim 54 having an absorption of less than 7cm⁻¹ at about 2820nm.